

### III. REMARKS

This Amendment and Response is being submitted in response to the Office Action dated September 24, 2004. Claims 1-20 are pending and claims 1-20 currently stand as rejected by the Patent Office. In this Amendment and Response, claims 1-5, 12-16, 18 and 20 have been amended, claims 7-11 have been cancelled without prejudice, and new claims 21 and 22 have been added. In light of the new claims presented and remarks made herein, the Applicant respectfully requests consideration of the claims.

#### 35 U.S.C. § 112

Claims 4, 5, 15, and 16 have been amended to address the rejections under 35 U.S.C. § 112. The problematic language in claims 4 and 15 has been deleted and the antecedent basis issue in claims 5 and 16 has been corrected. Claim 10 has been cancelled rendering moot any further discussion of this claim under 35 U.S.C. § 112.

#### 35 U.S.C. § 102(b)

In the Office Action of September 24, 2004, the Patent Office indicated that claims 1, 4, 6, 7, and 11 are anticipated under 35 U.S.C. § 102(b) by Yamashita et al. (4,451,175) and claims 1-3 and 6 are anticipated under 35 U.S.C. § 102(b) by Kumagai (JP-03028408).

As provided by MPEP 2131, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). Furthermore, the elements must be arranged as required by the claim.

Independent claim 1 has been amended to include the elements of a means for determining the particle sizes of the materials comprising said layers, a means for determining the fluid retention properties of said layers based on said particle size, and a length of fiberglass having a distribution of pore sizes compatible with said particle sizes and said fluid retention properties. Because these elements are completely absent from both Yamashita et al. and Kumagai, amended claim 1 is not anticipated by either of these references and is thus believed to define patentably over this art. Claims 3, 4, and 6 depend from amended claim 1, and because claim 1 is believed to be patentable, these dependent claims are also believed to define

patentably over the cited art. Claims 7 and 11 have been cancelled, thereby rendering moot any further discussion of these claims under 35 U.S.C. § 102(b).

35 U.S.C. § 103(a)

In the Office Action of September 24, 2004, the Patent Office indicated that claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamashita in view of Kumagai, claims 5, 9, and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamashita in view of Horvath et al. (5,713,696), claims 12-15, 17 and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kumagai et al. in view of Goughnour (6,312,190), claim 19 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kumagai et al. in view of Goughnour and further in view of Almond et al. (5,064,308), and that claim 20 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kumagai et al. in view of Goughnour and further in view of Terashima et al. (3,859,798).

MPEP 2142 provides that to establish a *prima facie* case of obviousness, three basic criteria must be met: (i) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the teachings; (ii) there must be a reasonable expectation of success; and (iii) the prior art reference (or references when combined) must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and must not be based on the Applicant's disclosure. Furthermore, MPEP 2143 provides that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. Finally, MPEP 2141 provides that when an Examiner is applying 35 U.S.C. 103, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention.

Claims 8, 9, and 10 have been cancelled, thereby rendering further discussion of these claims under Section 103(a) unnecessary. Regarding the Section 103(a) rejection of claim 5 as being unpatentable over Yamashita in view of Horvath et al., the Applicant asserts that this claim, which depends from amended claims 1 and 4 is not obvious because there is no suggestion or motivation either in the references themselves or in the knowledge generally

available to one of ordinary skill in the art, to combine the teachings of the references to arrive at the claimed invention. Furthermore, the combined references do not teach or suggest all of the claim limitations and there is no expectation of success.

In the system disclosed by Yamashita et al., soft ground composed of silt or clay soils and containing high water content is consolidated by constructing sand drains in the soft ground and applying a load. The sand drains are readily deformable and do not by themselves support the load, whereby a high consolidation effect may be attained. Yet, in the sand drain method of Yamashita et al. simply installing the drains is insufficient to remove the excess water that inhibits consolidation. This is because silt and clay soil can retain a large volume of water under negative hydrostatic pressures that will not freely flow into the permeable sand drain. A sufficient textural difference exists between the silt or clay containing soft ground and the more permeable sand drains so that a capillary break occurs to subsequently inhibit flow. Therefore, a load must be applied to the soil to produce positive hydrostatic pressures within the pores of the soft ground allowing this water to flow into the sand drain. This load must also be sufficient to force water to rise through the sand drain and discharge to a vertically higher elevation. Essentially, the permeable sand drain is acting as a well, and a load must be applied to the soil surface, forcing water from the pores of the soft ground and against the force of gravity to a vertically higher discharge location.

Regarding the claimed invention, the pore sizes and water retention properties of the passive capillary drains, i.e., the elongated porous drainage members, are designed to closely match and be compatible with the porosity of the sandy root zone so that a capillary break does not occur. Further, water flow within the drains occurs downward, with the force of gravity. As such, there are no requirements to apply a load to the soil to increase hydrostatic pressures within the soil being drained. In Yamashita et al. the pore sizes within the sand drain do not match the pore sizes in the soil being drained. Consequently, a load must be applied to the soil to overcome the capillary break. In the claimed invention, no external loading of the soil is required.

The system of Yamashita et al. operates on an entirely different principle than the claimed invention; thus, there is no motivation to use the fiberglass geotextiles of Horvath with, or in place of the sand drains of Yamashita. Furthermore, the geotextile disclosed in Horvath

operates merely as a filter for restricting the flow of particles of retained earth materials from entering the actual drainage layer (see column 5, lines 58-64). This geotextile is not used as a drain; thus, there is no suggestion or motivation for substituting this material for the sandy material taught by Yamashita et al. to arrive at the claimed invention. Finally, the cited references do not teach or suggest all of the claim limitations because the limitation of a length of fiberglass having a distribution of pore sizes compatible with particle sizes and fluid retention properties is absent from both Yamashita and Horvath.

Regarding the Section 103(a) rejection of claims 12-15, 17 and 18 as being unpatentable over Kumagai et al. in view of Goughnour, the Applicant again asserts that these claims are not obvious because the combined references do not teach or suggest all of the claim limitations and there is no reasonable expectation of success in combining the teachings of the references.

The system disclosed by Kumagai et al. appears to facilitate drainage of a mixed earth surface layer underlain by a volcanic gravel layer. This system consists of excavating a recessed groove near the interface, placing a prefabricated, water permeable body in the recessed groove, and backfilling the groove with residual mixed earth material. The water permeable body is an entanglement of vinylidene chloride fibers with granular, synthetic resin bodies encased by a filter net. Whereas the drainage structure as described by Kumagai et al. may be permeable to water there is no evidence given that the body is water wettable. Specifically non-wettable are the vinylidene chloride fibers of Kumagai et al. since vinylidene chloride as a polymer film has been produced and marketed for many years under the trade name 'Saran Wrap,' a water repellent film.

The suspected water repellency of the permeable body of Kumagai et al. differs from the claimed invention, where wettability is a significant property of the capillary drain. Consequently, whereas the permeable body of Kumagai et al. may be varied to match the condition of the stratum, it would fail to possess the same capillary attraction for water as the mixed earth layer. That is, the water permeable body and the mixed earth layer are not specifically shown to have, or are even suspected to have similar water retention properties. The result, as with the invention by Yamashita et al., is that a positive hydrostatic pressure must occur in the mixed earth layer before water will flow from this layer into the permeable body.

Water within a suspended capillary fringe, as would occur when a mixed earth layer is located above a volcanic gravel and may in addition pose a drainage problem, would not be drained from the mixed earth layer as it is retained under a negative hydrostatic pressure.

The Patent Office has apparently interpreted the arrows in Figure 6 of Kumagai et al. as indicating an extension of the permeable body through the volcanic gravel layer. Yet the Constitution section of Kumagai et al. states that the water permeable body is placed into a recessed groove to the depth reaching the proximity of the boundary between layers. This statement and the figures indicate, however, that the water permeable body does not in fact span the thickness of the gravel layer. Rather, the arrows in Figure 6 are indicative only of the desired path of water flow. Thus, there are two principal reasons why water occurring in a suspended capillary fringe, as would occur when a mixed earth layer is located above a volcanic gravel, would not be drained when using the embodiment of Kumagai et al. First, there is a suspected, vertical capillary break between the mixed earth and the permeable body due to differences in water wettability and consequently water retention properties of the two media. Yet, even if water wettability differences were not the case, then because the water permeable body fails to extend through the gravel layer, a corresponding, horizontal capillary break would occur between the water permeable body and the volcanic gravel. This would itself create a suspended capillary fringe within the water permeable body. The claimed invention provides similarity of water retention between the capillary drainage members and the surface soil and extends the capillary drain through the gravel layer. This ensures that neither a vertical capillary break would occur between the drain and the surface soil nor a horizontal capillary break would occur between the drain and the gravel. This further ensures that the suspended capillary fringe would be allowed to drain from the surface layer.

As discussed above, the system of Kumagai et al. operates differently than the claimed invention and does not provide the continuous vertical and horizontal capillary drainage action of the claimed invention. Combining the teachings of Kumagai et al. and Goughnour does not result in a functional capillary drainage system such as that of the claimed invention; thus, due to the materials and installation taught by Kumagai et al., there is no reasonable expectation of success. Furthermore, the element of a fiberglass drainage member is absent from both Goughnour with

Kumagai et al.; therefore, these references do not teach or suggest all of the claim limitations. For these reasons, claims 12-15, 17 and 18 are believed to define patentably over the prior art.

Regarding the rejection of claim 19 under Section 103(a) as being unpatentable over Kumagai et al. in view of Goughnour and further in view of Almond et al., the Applicant asserts that in addition to the arguments presented above, there is no motivation or suggestion to combine these references. Specifically, the system of Almond et al. is for use with flat, level-graded, natural grass athletic surfaces (see column 6, lines 59-66). Putting greens are typically uneven and are not necessarily level-graded; thus, the system of Almond et al. would be incompatible with the systems of Kumagai et al. and Goughnour for providing a capillary drainage system for use with putting greens. Therefore, claim 19 is believed to define patentably over the cited references.

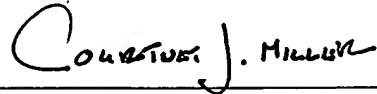
Regarding the rejection of claim 20 under Section 103(a) as being unpatentable over Kumagai et al. in view of Goughnour and further in view of Terashima et al., the Applicant asserts that in addition to the arguments presented above, there is suggestion or motivation to combine these references to arrive at the claimed invention. The system taught by Terashima requires the use of a casing 22 in combination with a vibro-hammer 24 (see column 4, lines 8-11 and 44-49). Kumagai et al. utilizes recessed grooves filled with a prefabricated water permeable body and includes no discussion of hammering anything into the ground. Therefore, there is no motivation whatsoever to combine the cited references to arrive at the claimed invention and claim 20 is believed to define patentably over the cited art.

### Conclusion

For the reasons set forth herein, this application is believed to be in condition for allowance, as the claims are believed to define patentably over the relevant prior art. Favorable reconsideration of this application is respectfully requested.

Respectfully submitted,

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